

Queensland Climate Change Centre of Excellence

Monthly Climate Statement – July 2011

Key messages

- Strong La Niña conditions prevailing over last summer have now broken down.
- The El Niño-Southern Oscillation (ENSO) is likely to remain in a neutral state over winter.
- Rainfall probabilities for July to September are currently slightly below normal.
- Sea-surface temperatures in the extra-tropical Pacific are currently favourable for summer rainfall, although this pattern may change.

- The likely continuation of ENSO-neutral conditions over the coming months is supported by most [global climate models](#).

Findings for July 2011

The Queensland Climate Change Centre of Excellence (the Centre) considers that **the probability of above-median rainfall for the next three-month period (July to September) is slightly lower (30-40 per cent) than normal (50 per cent) for most of Queensland. However, for the coming summer (November to March), the Centre's long range experimental SPOTA-1 scheme currently indicates a higher than normal probability of above-median rainfall across Queensland.**

The Centre's understanding is based on the current and projected state of the ENSO phenomenon and on factors which alter the impact of ENSO on Queensland rainfall (e.g. the Pacific Decadal Oscillation (PDO)). The Centre's outlook for the July to September period is based on an historical analysis of Queensland rainfall and the Southern Oscillation Index (SOI). The Centre's long-lead outlook for summer is based on the current sea-surface temperature pattern in the extra-tropical Pacific.

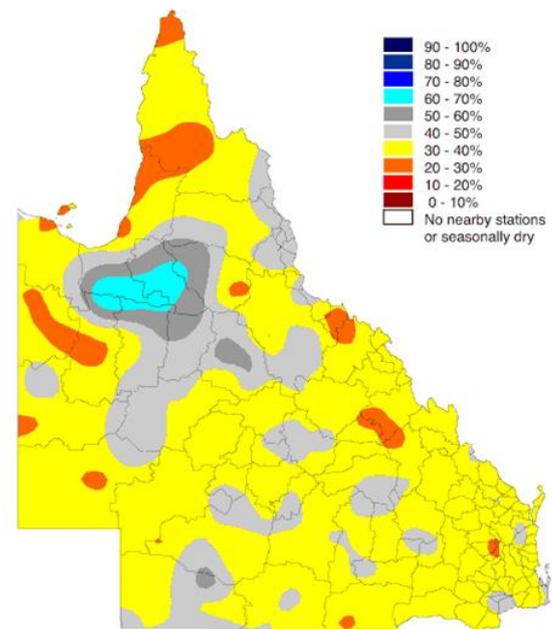
As at 1 July 2011, the Centre notes that the ENSO phenomenon is currently in a neutral state. ENSO-neutral conditions are likely to continue to prevail through winter and spring (see the latest Bureau of Meteorology '[ENSO Wrap-Up](#)').

Currently, in relation to the ENSO phenomenon:

- The Southern Oscillation Index (SOI), a key atmospheric measure of ENSO, was near-zero in May (+2.1) and June (+0.9).
- Observed sea-surface temperatures in the key [Niño 3.4 and Niño 4 regions](#) continued to warm in June and are currently near-average.

Probability of exceeding Median Rainfall

for July / September
based on a Consistently Near-Zero phase
of the SOI during May / June



The Centre also closely monitors sea-surface temperature patterns across the Pacific Ocean and, on this basis, makes a long-lead assessment of rainfall probabilities for the coming summer.

The [sea-surface temperature pattern](#) in the North Pacific remains consistent with a 'Cool Phase' of the [PDO](#). The PDO modulates the impact of ENSO on summer rainfall in Queensland, particularly under La Niña conditions. Historically, the ENSO and PDO signals have had the strongest impact on rainfall in north-eastern Queensland and the weakest impact in south-eastern Queensland.



Whilst both sea-surface temperatures in the equatorial Pacific and the SOI have returned to near-average values, there remains a strong sea-surface temperature gradient across the South West Pacific which is a remnant of the recent La Niña signal. Based on the Centre's experimental SPOTA-1 scheme, this strong sea-surface temperature gradient in the South West Pacific, combined with a 'Cool Phase' of the PDO, increases the probability of above-median rainfall for the coming summer (November to March). Some global climate models (e.g. Bureau of Meteorology's experimental POAMA-2 model and the US National Centers for Environmental Predictions model) are also indicating a return towards a cooler (La Niña) sea-surface temperature pattern in the equatorial Pacific (see the latest Bureau of Meteorology ['ENSO Wrap-Up'](#)). The Centre will continue to monitor this sea-surface temperature patterns each month until November and revise the rainfall outlook for summer on this basis each month until the start of summer.

Rainfall outlook

Whilst [rainfall over the last three-month period](#) (April to June) has been close to the historical median for much of Queensland, rainfall has been below-median in the south-west of the state.

There are various approaches used to provide probabilistic rainfall outlooks based on the above information. These approaches tend to differ in terms of which components of the climate system are considered and, for this reason, each approach may convey a different outlook, particularly for specific locations.

The Centre produces two statistical climate risk assessment schemes:

- The experimental [SPOTA-1 scheme](#) integrates sea-surface temperature information, including indices of ENSO and the PDO.
- The [SOI Phase scheme](#) relies solely on the SOI, an atmospheric measure of ENSO.

The Centre's experimental [SPOTA-1 scheme](#) provides long-lead probabilities of summer (November to March) rainfall for Queensland from mid-April through to mid-November each year. The sea-surface temperature gradient (west to east) across the South Pacific Convergence Zone (i.e. between eastern Australia and the Central Pacific) remains quite positive (+1.69°C), a remnant of the recent La Niña pattern. According to the Centre's experimental SPOTA-1 scheme, a positive sea-surface temperature gradient across this region is favourable for summer rainfall in Queensland.

The SPOTA-1 scheme, which takes this sea-surface temperature gradient into account, as well as the state of the PDO, currently indicates a higher than normal probability of above-median rainfall throughout Queensland over the coming summer.

The Centre's SOI Phase scheme, which is based on recent monthly values of the SOI, indicates that the [probability of exceeding median rainfall](#) across most of Queensland is slightly lower (30-40 per cent) than normal for the next three-month period (July to September). This is discussed further in the Centre's [commentary on rainfall based on phases of the SOI](#).

The above schemes indicate probabilities based on historical relationships. It is important that the probabilistic nature of seasonal outlooks is understood and long-term risk management is undertaken. For example, if an outlook indicates a 70 per cent probability of above-median rainfall, this also means there is a 30 per cent probability of below-median rainfall. Additionally, an increased risk of above or below-median rainfall in Queensland due to ENSO will not necessarily result in above or below-median rainfall occurring throughout all of the state (see [Australia's Variable Rainfall poster](#) or the Centre's [archive of historical rainfall maps](#)).

The Centre understands that each of the schemes may have its own particular following. Although such schemes cannot provide outlooks with absolute certainty each year, users of the information who follow a skilful scheme should benefit from doing so in the long-term. Users should consider the historical track record of any scheme and such information is becoming increasingly available. The Centre's Long Paddock website provides an historical archive of [SPOTA-1 reports](#) and [past commentaries](#) on the SOI Phase scheme. Users should also consider the wide range of information available each month describing the current state of the ocean/climate system, for example the ['ENSO Wrap-Up'](#).

ENSO influences other climate variables apart from rainfall (e.g. temperature, pan evaporation and vapour pressure). This means that the impact of ENSO on crop or pasture growth can be stronger than on rainfall alone. The impact of ENSO on pasture growth is also dependent on current pasture condition and soil water status. The Centre's AussieGRASS model takes these factors into account in producing pasture growth seasonal probabilities.

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